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External Protozoan Parasites of Sarowa Fish (*Trachurus mediterraneus*) from Mediterranean Sea at Zliten Coastal Area, Libya

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Abstract

The aim of this study to conduct general survey of external protozoan parasites on (Sawrow) Trachurus mediterraneus from the Mediterranean Sea at coastal area of Zliten city, Lybia. Atotal of 12 specimens of fish species namely Trachurus mediterraneus were collected randomly. The fish were transported immediately alive to the laboratory in the Division of Marine Organisms and Fish Culture, College of Marine Resources, Asmarya University, where they were maintained alive in well aerated glass aquaria. External examination of each of fish for parasites was carried out. The study revealed different types of ciliates include Trichodina spp., Ichthyophthyrus spp., *Epstylis* spp., *Chillodenella* spp., *Trichophyra* spp. and *Vorticella* spp. and different type of flagellate which include, Amyloodinium spp., Cryptocaryon spp. Piscinoodinium spp. *Vorticella* spp.and *Cryptobia* spp. with density .83 in skin and .58 in the gill.

Keywords: Marine Protozoa; Fish; Costal Area; Zliten

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Introduction

Aquaculture is currently one of the fastest growing food sectors in the world, with the majority being finfish production. The total world fish production is expected to reach 196 million tons (Mt) by the year 2025, where aquaculture is estimated to surpass the total production of capture fisheries. However, the capture sector is expected to remain dominant for a number of fish species and still be vital for supplying seafood both locally and globally (FAO, 2020). Fish is of importance in the diet of different countries especially in the tropics and subtropics where malnutrition is a major problem [1].

Wild-caught fish usually harbor several different parasites, as this is a common occurrence in fish under natural conditions several of these species show a high degree of host specificity and some even have complicated life cycles involving different animal species/types as intermediate hosts and are as such not directly transmitted from fish-to-fish [2]. However, some being zoonotic pathogens [3].

Parasitic infections often give an indication of the quality of water, since parasites generally increase in abundance and diversity in more polluted waters. According to Klinger and Francis-Floyd (2009) protozoa are a vast assemblage of eukaryotic organisms and that most of the commonly encountered fish parasites are protozoa. These parasites attack the fish, causing massive destruction of skin and gill epithelium. Representatives within the main protozoan groups such as amoebae, dinoflagellates, kinetoplastid flagellates, diplomonadid flagellates, apicomplexans, microsporidians and ciliates have been shown to cause severe morbidity and mortality among farmed fish [4].

Trachurus mediterraneus are found usually near the bottom, at times also in surface waters; pelagic and migratory in large schools. They feed on other fishes especially sardines, anchovies and small crustaceans. This is a commercial species. It can be caught by various gears such as seines and fixed nets. The contribution of Trachurus mediterraneus to local fisheries differs in each sea. In the Black Sea, this species makes up 54% of the total catch (2,919 t), whereas it makes up 39% in the Marmara Sea (562 t), 4% in the Aegean Sea (247 t) and 3% in the northeastern Mediterranean Sea.

The aim of this study to conduct general survey of external protozoan parasites on (Sawrow) Trachurus mediterraneus from

the Mediterranean Sea at coastal area of Zliten city, Lybia.

Materials and Method

Samples collection

Atotal of 12 specimens of fish species namely Trachurus mediterraneus were collected randomly. Fishes were collected by fishermen by using cast net and gill nets, during the period from August 2016 until the end of May 2017 from Zliten coastal area (Lat 32°30' N ; Long. 14°43' E) Modern harbour facility 156 km east of Tripoli; entrance shallow,.big.

The fish were transported immediately alive to the laboratory in the Division of Marine Organisms and Fish Culture, College of Marine Resources, Asmarya University, where they were maintained alive in well aerated glass aquaria.

External examination

Visual examination of the body surface for external lesions, ulcers, furuncles or granuloma especially fins, tail and gill for proliferative and necrotic changes was done.

External examination of each of the fish for parasites was carried out. The skin, gill and fins were also examined for ectoparasites by naked eye .Then wet smears were taken from the skin, fins and gills and carefully were air dried, fixed in methanol for 10 min, and then stained with 5% Giemsa's solution in phosphate buffer (pH 7.3) for 30 min. Smears were then examined using an Kruss optronic microscope with an oil immersion lens.

Photography

Kruss optronic microscope with camera(BEL,Eurkm 10.0) was used to photograph the parasite slide. The parasites were identified using images from websites such and by making their sketches as observed on the microscope and compared with the pictorial guide on fish parasites by then identified.

Result and Discussion

The present study showed the existence of different stages of species of external protozoans **(Figures 1-7)**. The distribution of the parasites, their location on the fish host body and mean intensity of infection are summarized in **Table 1.**

According to [5] parasite of fish can either be external or internal. Parasitic infections often give an indication of the quality of water, since parasites generally increase in abundance and diversity in more polluted waters and parasitic diseases are very common in

Trachurus mediterraneus Common names | Synonyms

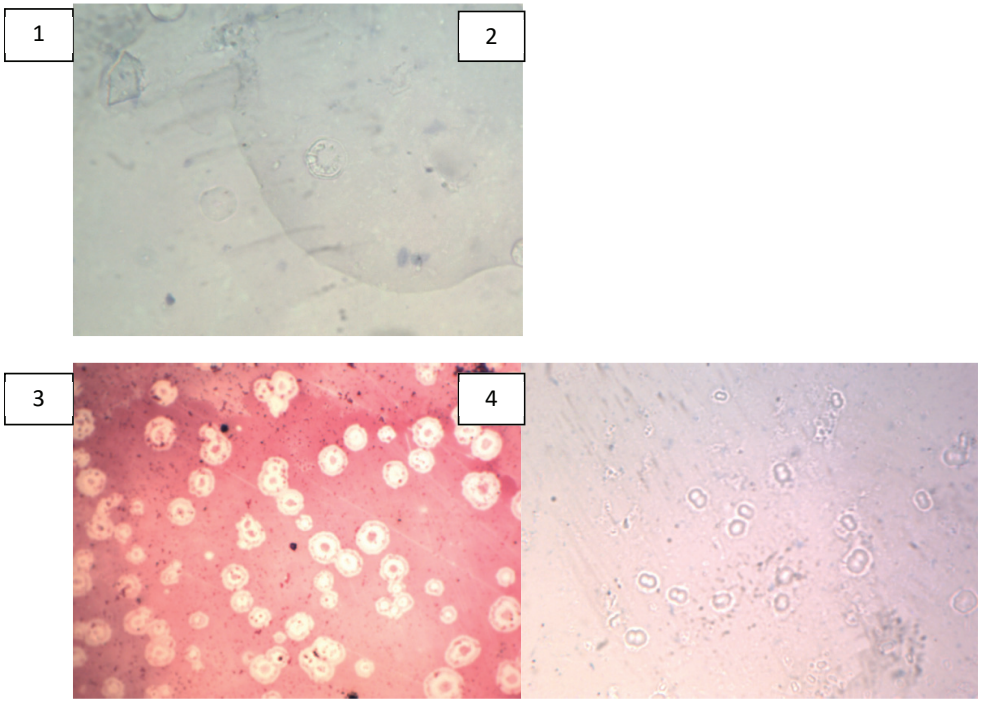

Figure 1 Different Types of Trichodina.

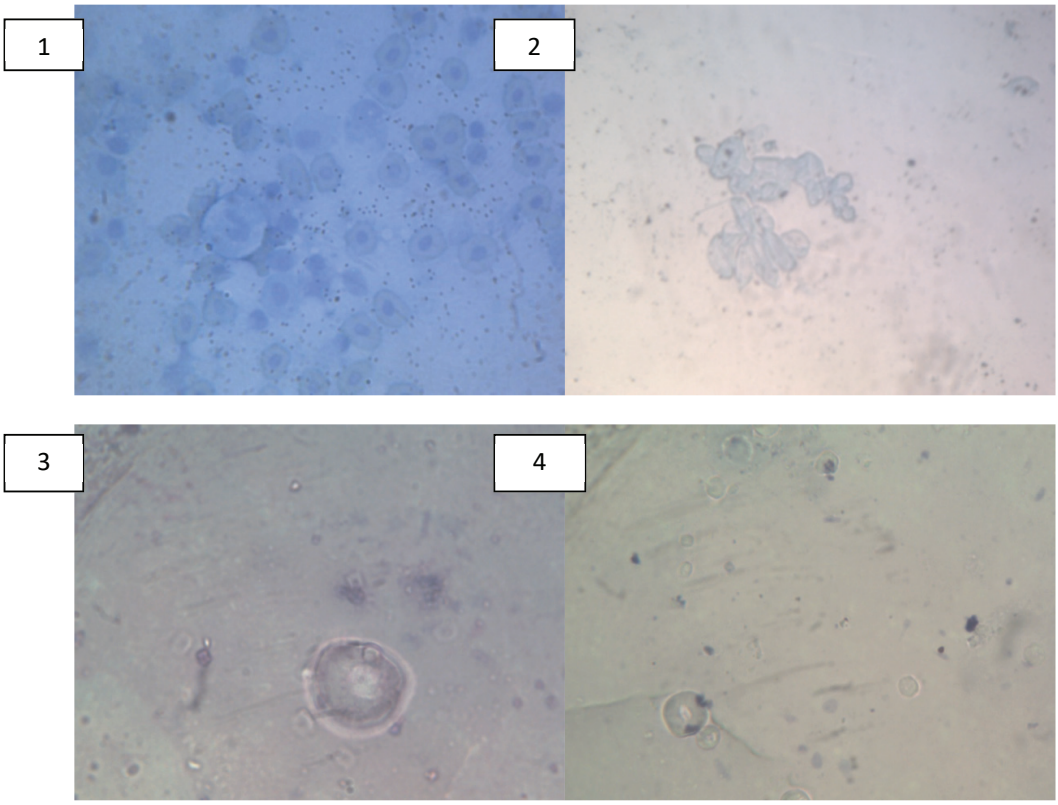

Figure 2 *1 Ichthyophthyrus sp., 2 Epstylis sp. 3 and 4 Chillodenella sp.*

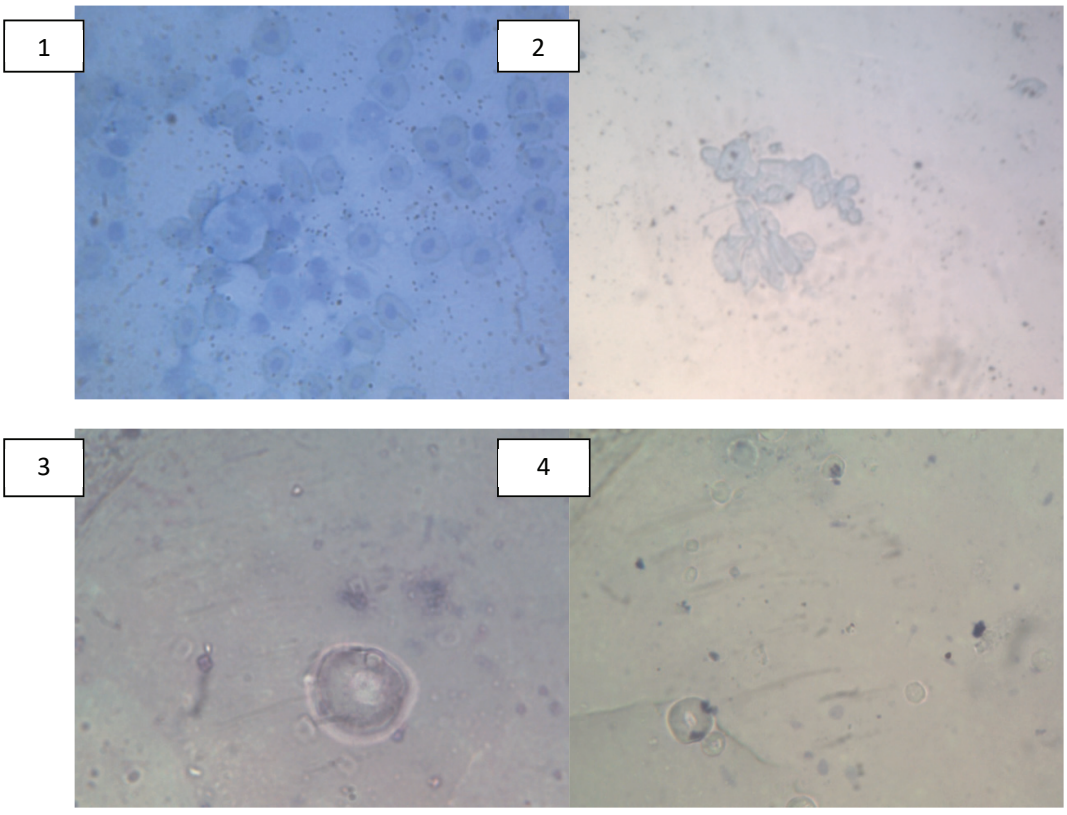

Figure 3 1,2 *Trichophyra sp.,* 3 *Tetrahymena sp.*

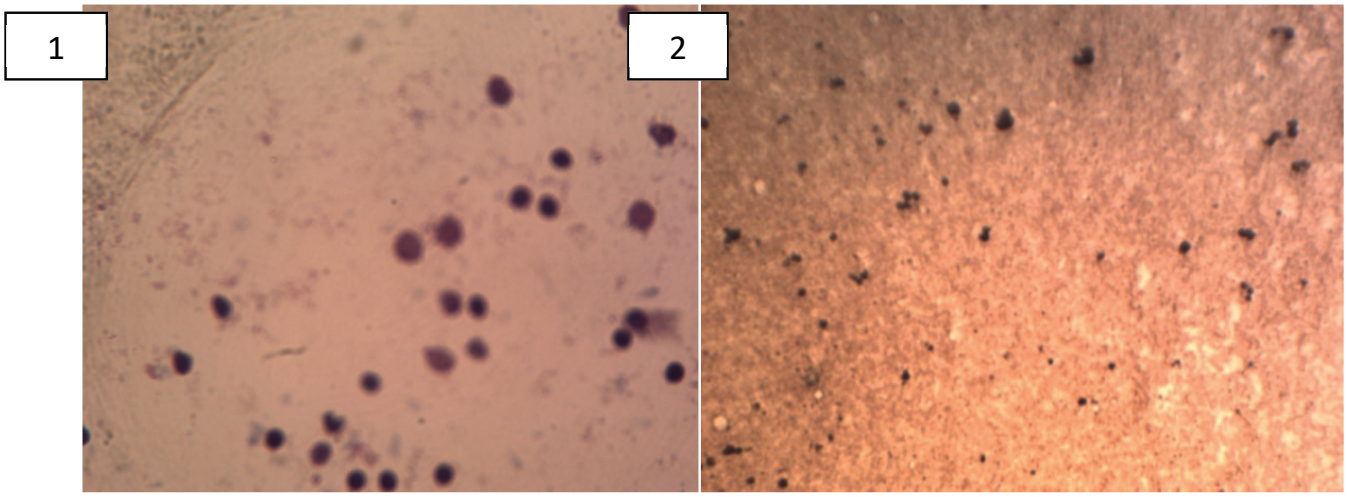

Figure 4 1 *Amyloodinum sp*. in the gill and 2 *Amyloodinum sp*. in the skin.

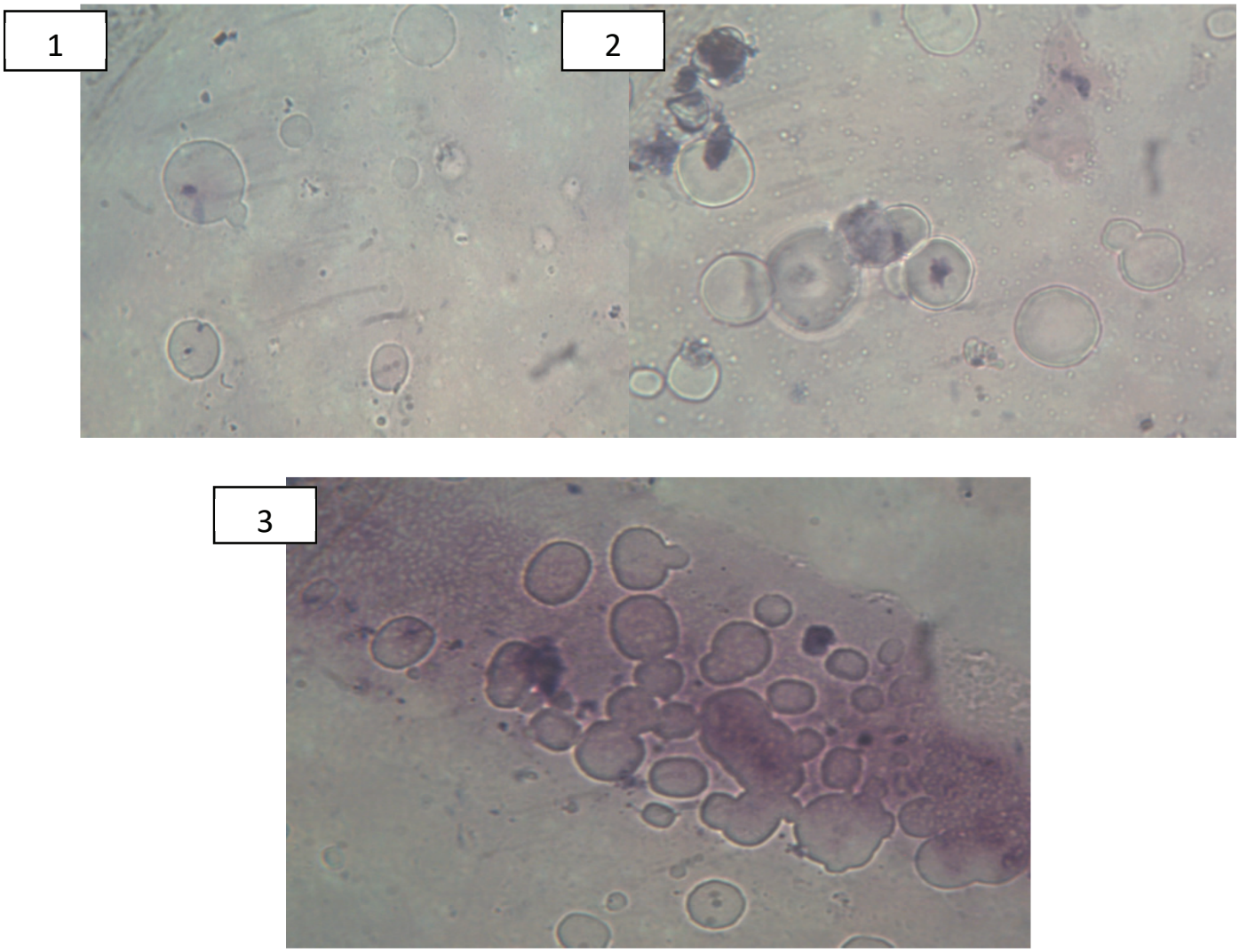

Figure 5 1,2,3 different forms of theront of *Cryptocaryon irritants* .

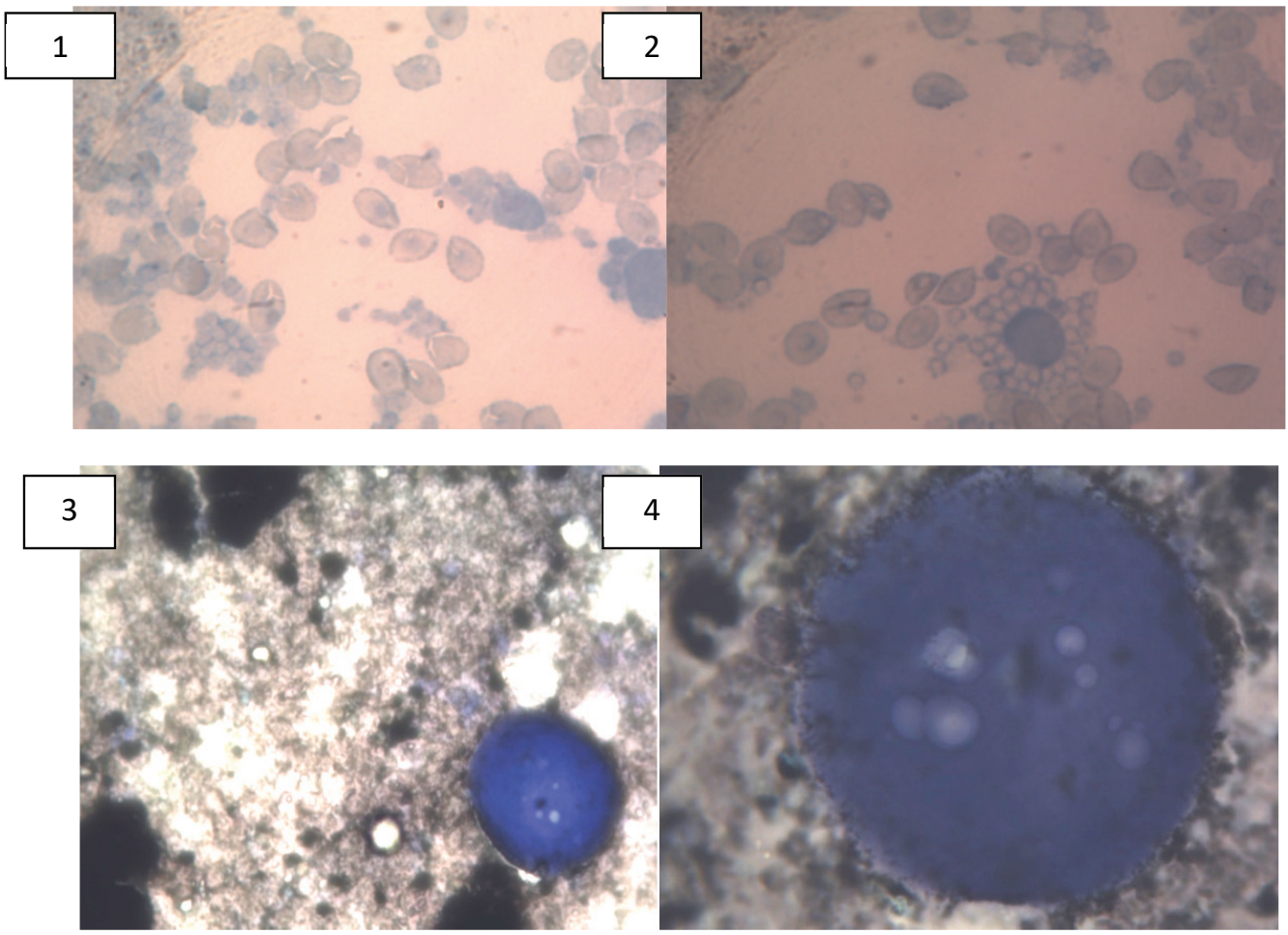

Figure 7 1,2 *Cryptobia sp*. in the skin and 3,4 *Cryptobia sp*. in the gill.

Table 1. List of parasites species found in the external organs.

	Site of infection	
Parasites	Skin	gill
Trichodina spp.	+	+
Ichthyophthyrus spp.	_	+
Epstylis spp	_	+
Chillodenella spp.	+	+
Trichphyra spp.	+	_
Teteahymena spp.	+	
Amyloodinium spp.	+	+
Cryptocaryon spp.	+	_
Piscinoodinium spp.	_	+
Vorticella spp.	+	_
Cryptobia spp.	+	+
Total	10	7
Density	0.83	0.58

fish all over the world and are of particular importance in the tropics.

The study revealed different types of ciliates include Trichodina spp., Ichthyophthyrus spp., *Epstylis* spp., *Chillodenella* spp., *Trichophyra* spp. and *Vorticella* spp. These parasites of worldwide distribution. This parasite is not host specific and fish can potentially transmit the parasite. Most of the protozoan's identified by aquaculturerists will be ciliates. *Apiosoma, Balantidium, Chilodonella, Epistyles, Ichthyophthirius multifiliis*, Tetrahymena and Trichodinidae are the main representatives [6]. Many of the parasites proliferate in organic debris accumulated in the bottom of a tank or vat [7].

They use fish only for attachment and do not invade the epithelial cells, thus feeding by filtration of suspended material in the water. This phenomenon is termed epibiosis, in which the ciliate acts as epibiont and the host as basibiont (substrate organism) [8]. When present in a population under high stocking densities associated with bacteria that colonizes its peduncle, this ciliate might cause host damage and then be named as parasite with greater impact in farmed catfish [9].

These include the following, Trichodinids can be found parasitizing both freshwater and marine fishes on the body surface, buccal cavity and gills. Nevertheless, relatively few of them have become endoparasites in the intestine, kidney and urinary bladder of their hosts (Lom and Dykova, 1992). Differently, some trichodinid species were found to be suppressed with increased water temperature .

Heavy infestations of juvenile lumpfish with Trichodina sp. have been reported. The parasites are a commonly reported finding in Norwegian aquaculture, but are not usually related to major health problems. Trichodinids have also been found in varying abundance on the gills of wild-caught wrasse, usually without any associated pathology. In a short period of time the increased number of parasites per host as observed.

Ichthyophthyrus spp. which causes disease called "Ich" or "white spot disease" has been a problem to aquarists for generations. The causative agent of ichthyophthiriasis or white spot disease is one of the most important fish parasites of worldwide distribution compromising skin, fins, gills and eyes of farmed fish. This parasite is not host specific and any freshwater fish can potentially transmit the parasite.

Epistyles are a stalked ciliate that attaches to the skin or fins of the host. *Epistyles* are of greater concern than many of the ciliates because it is believed to secrete proteolytic ("protein-eating") enzymes that create a wound, suitable for bacterial invasion, at the attachment site. Also Chilodonella species are free-living but some of them parasitize the skin, gills and fins of both freshwater, marine and estuary fish.

Other ciliates have been reported from the gills of wrasse without any apparent damage to the tissue, such as the Cryptocaryon-like ciliates. The species C. irritans is known as the cause of 'white spot' disease in marine fish. Similarly, protozoan ciliates have been found on Atlantic salmon.

According to, these ciliates do not form cysts and studies suggest that Tetrahymena penetrates the host epithelium (especially where there are wounds) reaching the blood and parasitizing the gills, kidney, eyes and brain. High organic loads and deterioration of water quality are often associated with heavy, debilitating *Ambiphrya* infestations.

Under a microscope, it can be observed three forms of the dinoflagellate from the scraps of fish: pear-shaped, banana-shaped and the mature rounded parasite of brownish color. although in high infestations different developmental stages can be found. Special care must be taken on the mature trophonts that could be confused with I. multifiliis by an inexperienced person.

Amyloodinium comprises dinoflagellates of varied shape depending on the life stage. The causative agent of velvet disease A. ocellatum is ubiquitous, affects marine farmed fish and may provoke important outbreak mortalities and economical losses in aquaculture systems.

Piscinoodinium is a sedentary flagellate that attaches to the skin, fin, and gills of fish. The common name for *Piscinoodinium* infection is "Gold Dust" or "Velvet" Disease. The parasite has an amber pigment, visible on heavily infected fish. Affected fish will flash, go off feed, and die. *Piscinoodinium* is most pathogenic to young fish.

Cryptobia is a flagellated protozoan common in cichlids *Cryptobia* typically is associated with granulomas in which the fish "walls off" the parasite [10]. These parasites have been observed primarily in the stomach, but may be present in other organs. Some organisms are commensals rather than true parasites. For example, *Cryptobia* dahli is a flagellate commonly found within the stomach of wild-caught lumpfish. It is regarded as harmless for the lumpfish, since it does not cause any apparent damage to the gastric tissue, even when present in extremely high numbers. As such, it is not considered to become a problem for lumpfish aquaculture in the future.

Parasitism is a key component in all ecosystems, playing a fundamental role at the population level and wider ecological scales. Although parasites play a key role in food web interactions, their diversity, dynamics, and influence on ecosystems remain neglected.

References

1 Bruno DW, Nowak B, Elliott DG (2006) Guide to the identification of fish protozoan and metazoan parasites in stained tissue sections. Diseases of Aquatic Organisms 70: 1- 36.

2 Buchmann K (2015) Impact and control of protozoan parasites in maricultured fish. Parasites in Fisheries and Mariculture (124): 168-177.

3 https://www.researchgate.net/publication/264789298_Infectious_diseases_of_warmwater_fish_in_marine_and_brackish_waters

4 Dyková I, Tyml T, Kostka M, Pecková H (2010) *Strains of Uronema marinum (Scuticociliatia)* co-isolated with amoebae of the genus Neoparamoeba. Diseases of Aquatic Organisms 89: 71- 77.

5 Eiras JC, Takemoto RM, Pavanelli GC, Luque JL (2012) Checklist of protozoan parasites of fishes from Brazil. Zootaxa 3221: 1-25.

6 https://io.furg.br/images/PARASITOS-PEIXES-MARINHOS-AMERICA-SUL-EBOOK.pdf

7 https://www.fao.org/3/ca9229en/ca9229en.pdf

8 Freeman MA, Kristmundsson A (2018) A closer look at *Cryptobia dahli*: a parabodonid flagellate from the stomach of the Atlantic lumpfish. Bulletin of the European Association of Fish Pathologists 38: 195- 201.

9 https://www.vetinst.no/rapporter-og-publikasjoner/rapporter/2019/fiskehelserapporten-2018

10 Ishikawa MM (2012) *Trichodina heterodentata (Ciliophora: Trichodinidae):* a new parasite for (Pisces: Characidae). Piractus mesopotamicus, Zootaxa 3422 (2012): 62-68.